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REVIEW OF THE FISHES OF THE BLENNIOID GENUS ECSENIUS, WITH DESCRIPTIONS OF FIVE NEW SPECIES

By Wilbert M. Chapman [1] and Leonard P. Schultz

McCulloch described the fish genus *Ecsenius* on the basis of a new species, *E. mandibularis*, from Australian waters. Norman further defined the genus and indicated that several other species of blennies, formerly referred to *Salarias* Cuvier, should properly be included in *Ecsenius*. The present study is a review of the genus and the species included in it.

Ecsenius is a closely knit genus of 11 known marine species occurring only in the tropical Indo-Pacific faunal area. Within that area species have been found from the Red Sea on the west through the Marshall and the New Hebrides Islands to the Hawaiian Islands on the east and from Formosa on the north to Queensland, Australia, on the south. While this genus occurs in the coral area, in relation to coral heads, it typically occurs not on the shallow reefs but apparently in moderate depths, and this perhaps accounts for the relative scarcity of specimens in ichthyological collections.

The dentition clearly sets off *Ecsenius* from all other genera of blennies. In the upper jaw are more than 100 tiny, independently movable teeth, a condition typical of the genera *Istiblennius* Norman and *Salarias*, whereas in the lower jaw, the labial teeth are fewer than 50 in number, they are much stouter than those above (usually with the one or two teeth on each side farthest from the symphysis somewhat

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enlarged or stronger than the others), and they are only slightly flexible. This condition suggests *Rhabdoblennius*, and is distinctly in contrast with that of *Salarias* and *Istiblennius*. The canine far back on the lower jaw, typical of salariin blennies, is tiny but stout, and may be one or two in the same species. Furthermore, as Norman has reported, traces of more teeth in this same dentary series can be detected. Indeed, in the genotype *E. mandibularis* there are six or seven plainly apparent teeth on each dentary in this series, quite distinct from the series of labial teeth on the anterior part of the dentaries, a situation quite unknown in other salariin blennies. Norman has suggested, on this account, that *E. mandibularis* might be properly placed in a separate subgenus. A study of the other species of the genus has, however, inclined us to reject this suggestion. In all other particulars, *E. mandibularis* agrees closely with the other species of the genus. The types of that species are considerably larger than specimens available in the other species. It is possible that these latter are mostly juvenile and that the greater number of dentary teeth in *E. mandibularis* is simply a factor of age, representing an adult condition detectable as traces of teeth noted by Norman in other species.

While the condition of the dentition might indicate a relationship somewhere between *Istiblennius*, *Salarias*, and *Rhabdoblennius*, there is little else that does, and no lineal phyletic connection is apparent between *Ecsenius* and those three genera. The lack of orbital or nuchal cirri, the low number of dorsal spines, the unbranched caudal rays, the full membranous connection of the last anal ray to the caudal peduncle, the slender genital tube of the male, the elongation of one or more caudal rays well beyond the fin membrane, which is normal in most species, the lack of crenulation on the lips, the pelvics I,3, the short lateral line with its double, rather than single, line of pores, are characters that are mostly confined to *Ecsenius* among the salariin blennies, and, when put together, set the genus off sharply from its relatives. There are other more subtle but just as definite characteristics—the slender fin rays, which give an air of diaphanous fragility to the vertical fins, and the anterior profile, which is either vertical or even slopes backward from the forehead to the margin of the upper lip.

The distribution of the known specimens and species of the genus is suggestive of the division of the vast tropical Indo-Pacific fish fauna into subareas, illustrated by the other genera of Salariinae and other families of fishes studied by the authors. Two species have been found

only in the Red Sea and at Djibouti; two have been found only in the Solomon Islands; one each in the Marshall Islands, northeast Australia, the Philippines, Formosa, the Hawaiian Islands, the western Indian Ocean, and the Persian Gulf. Only one species has been determined to have a broad range, occurring in Ceylon, Bengal, Christmas Island, Timor, and the New Hebrides Islands. In discussions under each species some notes have been made of the possible relationships of the several species, but clarification of these relationships must await further collections throughout the range of the genus.

Genus ECSENIUS McCulloch

Ecsenius McCulloch, Rec. Australian Mus., vol. 14, p. 121, 1923. (Genotype, *E. mandibularis* McCulloch.)—Norman, Ann. Mag. Nat. Hist., ser. 11, vol. 10, p. 810, 1943.

Description.—Dorsal rays XII, 12–20; anal II, 13–21; pectoral 13–15; pelvic I,3.

No crest on head in either sex (except low ridge on large male of *mandibularis*); nasal cirrus either simple, bifid, or trifid; no supraorbital or nuchal cirrus; both lips smooth; one or more tiny, hidden canines posteriorly on each dentary; 45 to 50 firmly placed teeth in lower jaw (typical of *Blennius*); more than 100 independently movable, slender teeth in upper jaw (typical of *Istiblennius* and *Salarias*); no teeth on vomer; depth 3.6 to 6.0, head 3.3 to 4.8, both in standard length; lateral line a double series of pores anteriorly, ending under tenth or eleventh dorsal spine, not turning downward on side, continued on as a faint line with no visible pores to end of dorsal; dorsal notched or not, reaching to or over first small rays of caudal; last ray bound to caudal peduncle by membrane; caudal usually with 12, occasionally 13, unbranched principal rays, with 6 or 7 small rays above and below, mostly hidden under skin; upper and lower principal caudal rays typically exserted beyond margin of fin, by as much as length of shortest caudal rays in large individuals of certain species; 2 spines in anal, always plainly visible in male and usually so in female, but very minute in latter; no crenulated pads on first anal rays of male, instead these rays on adult males are normally a little swollen or bulbous at distal tip; no anal ray extends beyond margin of fin in males; last anal ray fully bound to caudal peduncle by membrane; males with a slender, tubular genital pore midway between anus and insertion of anal spine; pelvics always with I, 3 rays, the third soft ray normally bound to second and not visible without dissection; pelvic spine always present but not visible without dissection.

TABLE 1.—*Counts on certain species of* Ecsenius

Species	Number of fin rays																					Number of basal tentacles on each nostril		
	Dorsal								Anal									Pectoral						
	XII	12	13	14	15	16	17	18	II	13	14	15	16	17	18	19	20	12	13	14	15	1+0	1+1	1+2
bicolor	11	------	------	------	------	4	6	1	11	------	------	------	------	------	------	8	3	------	20	2	------	------	18	4
hawaiiensis	13	------	------	------	------	3	9	1	13	------	------	------	------	------	1	10	2	1	24	1	------	------	25	1
opsifrontalis	2	------	2	------	------	------	------	------	2	------	------	2	------	------	------	------	------	------	6	------	------	6	------	------
stigmatura	3	------	------	------	------	1	2	------	3	------	------	------	------	------	1	2	------	------	1	3	2	6	------	------
lividanalis	10	1	8	1	------	------	------	------	9	2	7	------	------	------	------	------	------	------	9	------	------	6	------	------
pro-oculis	1	------	------	1	------	------	------	------	1	------	------	1	------	------	------	------	------	------	2	------	------	2	------	------

KEY TO THE SPECIES OF ECSENIUS

1*a*. (See also 1*b* and 1*c*.) Pectoral with 15 rays and no dark spot around anus (Red Sea and Djibouti).

2*a*. Color of head, body, and vertical fins a rich, uniform brown, with no markings; dorsal XII,19; anal II,20 (Red Sea).
Ecsenius frontalis (Cuvier and Valenciennes)

2*b*. Color of head and body light tan with no markings other than a few scattered black specks on upper part of caudal peduncle; a jet black band as wide as eye diameter running along base of both spinous and soft dorsal, outer part of fin hyaline; top and bottom of caudal fin jet black to end of long rays, rest of fin hyaline; anal fin colorless; dorsal XII, 18; anal II,20 (Djibouti)——Ecsenius gravieri (Pellegrin)

1*b*. Pectoral rays 13 to 15, usually 14; anal rays II, 18 or 19; a distinct dark spot around anus; a large dark brown spot on base of caudal fin; dark brown streak from lower edge of eye backward across gill cover; dorsal rays XII, 16 or 17 (Philippines)——Ecsenius stigmatura Fowler, new species

1*c*. Pectoral with 13 or 14 rays, rarely 12; if area around anus is black anal rays are II,13 or 14 (tropical Indo-Pacific oceans).

3*a*. Nasal cirrus simple and single.

4*a*. Dorsal with 19 or 20 soft rays; anal with 21 or 22; a dark band along base of dorsal (western Indian Ocean and Persian Gulf).
Ecsenius pulcher (Murray)

5*a*. Body evenly brown, without markings——(Ecsenius pulcher, female)

5*b*. Head, throat, and body to level of sixth dorsal ray rich, light brown (paler below), without markings; rest of body to caudal abruptly pale, crossed by 5 or 6 equally spaced narrow, sharply defined vertical bars, reaching from dorsal to ventral edge of body.
(Ecsenius pulcher, male)

4*b*. Dorsal with 12 to 14 soft rays; anal with 13 to 17 soft rays; no dark streak along base of spinous dorsal and never sharply defined if present on soft dorsal.

6*a*. Spinous and soft dorsal separated by shallow notch in young but no notch at all in adults; sharply defined black spot, half the area of eye, around anus, set off from rich brown body by light peripheral band; no other markings on head, body, or fins; dorsal with 12 or 13 soft rays; anal with 13 or 14 soft rays (Solomon Islands).
Ecsenius lividanalis, new species

6*b*. Spinous and soft dorsal separated by a deep notch reaching nearly to base of fin; last dorsal spine minute, nearly hidden in basal fin membrane; no dark spot around anus; well-defined dark streaks, bars or spots on body; dorsal with 13 to 16 soft rays; anal with 15 to 18 soft rays.

7*a*. A row of 6 or 7 small teeth laterally on ridge of dentary; anal with 16 to 18 soft rays; double row of small, dark, roundish spots along side of body, but no bars or bands (Queensland, Australia)——Ecsenius mandibularis McCulloch

7*b*. One or 2 tiny teeth posterolaterally on the dentary, but never more; anal with 15 soft rays; no dark spots on body, but dark bars or bands present on sides; 2 pale horizontal bands, each as wide as pupil, running full length of body, one from upper corner of opercle, the other from under pectoral.

8*a*. Dorsal with 14 soft rays; a dark band as wide as pupil extending back from eye to opercular edge; no vertical dark bars on body; nasal cirrus about a third the diameter of eye in length; membrane from last dorsal ray covering first 3 or 4 small caudal shorter than postorbital length of head by about one-third the diameter of eye (Solomon Islands).

Ecsenius pro-oculis, new species

8*b*. Dorsal with 13 soft rays; dark band from eye extending beyond opercular edge onto body to a vertical from middle of spinous dorsal; 8 or 9 narrow, dark, vertical bars on body extending to base of dorsal, where 2 or 3 may be divided; nasal cirrus about half the diameter of eye in length; membrane of last dorsal ray not covering first few caudal rays; pectoral shorter than head by less than half the diameter of eye; pelvics longer than postorbital length of head by nearly half the diameter of eye (Marshall Islands).

Ecsenius opsifrontalis, new species

3*b*. Nasal cirrus always double, ventral one may be bifid or double; dorsal with 16 to 20 soft rays; anal with 19 to 21 soft rays.

9*a*. Head and anterior part of body evenly dark with no markings; posterior part of body and adjacent vertical fins often abruptly pale (bright golden in life) with no markings.

10*a*. Dorsal with 16 of 17 soft rays; anal with 18 to 20 soft rays (eastern Indian Ocean; Christmas Island; Timor; New Herbrides Islands).

Ecsenius bicolor (Day)

10*b*. Dorsal wth 20 soft rays; anal with 21 soft rays (Formosa).

Ecsenius namiyei (Jordan and Evermann)

9*b*. Middle of side of body with 5 to 7 short but distinct white bars evenly spaced; a dark spot behind eye; middle caudal fin rays dusky to blackish; body plain olive to light greenish brown, undersides pale olive.....Ecsenius hawaiiensis, new species

ECSENIUS FRONTALIS (Cuvier and Valenciennes)

Salarias frontalis CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 11, p. 328, 1836 (type locality, Massuah, Red Sea).—GÜNTHER, Catalogue of the fishes in the British Museum, vol. 3, p. 245, 1861 (in synonymy of ?*S. fuscus*).—BAMBER, Journ. Linn. Soc., vol. 31, p. 484, pl. 46, fig. 1, 1915 (Suakim, Red Sea).

Specimens.—Three specimens, 37 to 49 mm. long, from Baie de Djibouti, Gravier (in a jar with specimen of *Enchelyurus*), labeled as *Salarias fuscus*), P. M. 04.318; 1 specimen, 52 mm. long, collected by Crossland in Red Sea, B. M. 1915.10.25.9.

Description.—Dorsal rays XII,19; anal II,20; pectoral 15; pelvic I,3.

Nasal cirrus single and simple, on level with upper level of pupil, lanceolate, nearly as long as eye diameter; snout vertical or somewhat projecting; one or two tiny canines below on either side; depth 4.8 to 5.4, head 3.6 to 4.4, both in standard length; dorsal spines and rays

of same height, with no trace of notch, the fin ascending gradually to greatest height in middle of soft dorsal; last ray with its tip free from membrane binding it to caudal peduncle, the membrane not covering first small caudal rays; caudal truncate, upper and lower two rays extended out from level of fin; anal with tip of last ray free from membrane; pectoral extending back to anal insertion; pelvics are equal to two-thirds the postorbital length of head.

Coloration.—MALE: Color of head, body and vertical fins a rich uniform brown with no markings and the abdomen only a little more pale than the rest of body; peritoneum black; anterior top edge of spinous dorsal white; caudal somewhat dusky in the two larger males; pectorals pale and clear. FEMALE: As male, except caudal clear.

Remarks.—The four specimens listed are without doubt the *Salarias frontalis* of Cuvier and Valenciennes. Except for the lack of markings, the higher pectoral count, and the single nasal cirrus this species resembles *E. bicolor*, and it should be considered the Red Sea cognate of that species.

ECSENIUS GRAVIERI (Pellegrin)

Salarias gravieri PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 12, p. 93, 1906 (type locality, Djibouti).

Specimen.—One male, 53 mm. long, collected by Gravier in Baie de Djibouti, the type of the species. P. M. 04–319.

Description.—Dorsal rays XII,18; anal II,20; pectoral 15; pelvic I,3.

Nasal cirrus single and simple, no longer than diameter of pupil; snout vertical or forehead somewhat projecting; one or two tiny canines on either side below; depth 4.8, head 3.5, both in standard length; all dorsal spines except first excised, the first few to a third their depth; shallow notch between the spinous and soft dorsal, the last spine short and hidden in basal membranes; only tips of soft dorsal free; all caudal rays excised at tips, but upper and lower two principal rays extended by a length equal to two-thirds the length of the middle rays; dorsal and anal attached to caudal peduncle, the membranes reaching to, but not over, first small rays of caudal.

Coloration.—MALE: Except for a few scattered black specks on the upper part of the caudal peduncle the body and head are pale tan with no markings; peritoneum black; a jet black band running along base of both dorsals, as wide as eye diameter; outer part of fin perfectly clear and unmarked; a few scattered black specks on base of caudal; top and bottom of caudal jet black to end of long rays; rest of fin hyaline; anal and paired fins colorless. FEMALE: None available.

Remarks.—This species is closely related to *E. frontalis* (from the same locality), but the character of the dorsal and the striking color pattern seem to set it off clearly. This can scarcely be an older male

of *E. frontalis*, for specimens of the latter, examined in the Paris and British Museums, were of practically the same size as those of *E. gravieri*.

ECSENIUS STIGMATURA, Fowler, new species

FIGURE 90

Holotype.—U.S.N.M. No. 99379, Philippine Islands, Dammi Island between Jolo and Tawi Tawi Straits, lat. 5°52′12″ N., long. 120°31′00″ E., depth 244 fathoms, September 21, 1909, *Albatross*, standard length 46.5 mm., female.

Paratypes.—U.S.N.M. No. 111878, taken with the holotype and bearing same data, standard length 37 mm., female; U.S.N.M. No. 122444, Philippine Islands, Cataingan Bay, east of Masbate Island, April 18, 1908, *Albatross*, standard length 36.2 mm., female.

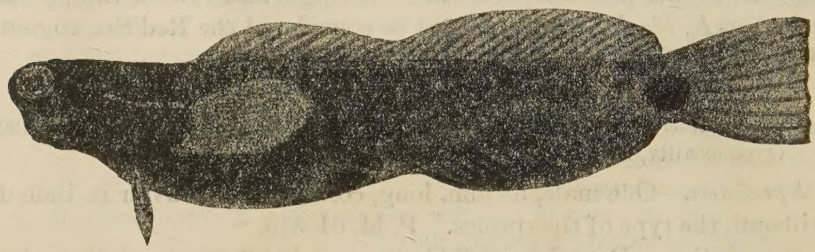

FIGURE 90.—*Ecsenius stigmatura* Fowler, new species. (From photograph of color drawing from the Philippine *Albatross* collection.)

Description.—The following counts were made on the holotype and paratypes, respectively: Dorsal rays XII,17; XII,17; XII,16; anal II,19; II,19; II,18; pectoral 13–14; 14–14; 15–15; pelvic I,3; I,3; I,3; no branched caudal rays; nasal cirri 1–1; 1–1; 1–1.

Certain measurements were made on the types and these data are recorded in thousandths of the standard length in table 2.

Head (tip of upper lip to end of gill cover) 3.6 to 4.0; greatest depth 3.8 to 4.7, longest pectoral ray 5.2 to 5.8, snout tip (upper lip) to anus 1.8 to 1.9, anal fin base 2.5 to 2.7, all in the standard length. Eye 2.7 to 3.3, snout 3.5 to 3.7, postorbital length of head 1.5, greatest depth of body 1.1, least depth of body 2.2 to 2.3, longest pectoral ray 1.4 to 1.5, longest dorsal spine 1.8 to 1.9, all in the length of head from tip of upper lip (snout) to rear of gill cover. Fleshy interorbital space 2.5 to 3.0 in eye.

No orbital cirrus; no nuchal cirrus; a single, simple, nasal cirrus arising on upper edge of nasal opening; snout profile with a notable backward slant of 25 to 30 degrees from the vertical; edges of both lips smooth; lateral line running a dorsal course over pectoral fin and ending about opposite tip of pectoral fin and base of eighth or ninth dorsal spine, not descending to middle of side; vertical line through

dorsal origin passes through rear edge of opercle, base of pectoral fin, and notably far behind base of pelvics; last dorsal ray attached by membrane to dorsal edge of caudal peduncle but not to base of caudal fin; anal origin opposite base of last dorsal spine; last anal ray attached by membrane to lower edge of caudal peduncle; pectoral fins reaching about two-thirds the way to the anus; anal spines small, first embedded; posterior canine of lower jaw short but strong; teeth in upper jaw about 110, movable, those in lower jaw larger, movable, about 40 to 45 in number, the teeth on each side farthest from the symphysis notably enlarged; no vomerine teeth; posterior margin of caudal fin probably truncate; no cephalic crest; a vertical line through front edge of upper lip passes through front edge of eye; forehead a little in front of tip of upper lip.

Coloration.—In alcohol: Background coloration plain reddish brown; a large area in front of anus blackish brown; on base of caudal fin and on caudal peduncle a dark brown spot, somewhat angular posteriorly; pectoral, pelvics, dorsal, and caudal fins hyaline or pale; anal fin dusky brown; a narrow dark brown streak extends from lower edge of eye backward to rear angle of opercle, below this dark streak on opercle is a narrow pale streak that continues on body behind head only, just dorsal to base of pectoral fin.

Alive (based on color sketch made on *Albatross*): Background coloration reddish brown; anal spot purplish black; caudal spot black; anal reddish brown; dorsal spines orange; an orange streak along base of dorsal fin; iris orange; dark streak behind eye is dark blue, and pale streak below it is orange; upper lip slightly yellowish brown.

Ecology.—This species probably came from deep water, as the *Albatross* dredge record indicates 244 fathoms.

Remarks.—*E. stigmatura* is one of two known species with a black area (purplish black when alive) in front of the anus; *E. lividanalis*, new species, lacks the caudal spot and streaks behind the eye. Additional characters that distinguish *E. stigmatura* from the other species referred to the genus may be found in the accompanying key.

ECSENIUS PULCHER (Murray)

Salarias pulcher Murray, Journ. Bombay Nat. Hist. Soc., vol. 2, p. 47, 1887 (type locality, Kurrachee Manora Rocks, India); Indian Ann. Mag. Nat. Sci., vol. 1, p. 23, 1887 (Kurrachee, India).

Salarias phantasticus Boulenger, Ann. Mag. Nat. Hist., ser. 6, vol. 20, p. 422, 1897 (type locality, Mekran Coast, Persia).

Salarias anomalus Regan, Journ. Bombay Nat. Hist. Soc., vol. 16, pp. 327, 331, pl. B, fig. 4, 1905 (type locality, Persian Gulf; Mekran Coast, Karachi); Journ. Zool. Soc. London, p. 406, 1909 (on type material).

Specimens.—Two males, each 45 mm. long, collected by Murray at Kurrachee (the types of *Salarias pulcher*), B. M. 87.9.22.59—60; 2

males, 56 and 58 mm. long, collected by Townsend on Mekran Coast, Persia (types of *Salarias phantasticus*), B. M. 97.9.22.20–21 (these are like *pulcher* types except that the posterior dorsal spines and caudal rays are even longer and more extended; black vertical lines, respectively, 7 and 8; two tiny black dots on posterodorsal quarter of orbit); 16 female, 32 to 58 mm. long, collected by Townsend in Persian Gulf (the type series of *Salarias anomalus*), B. M. 1900.5.9.47–56; 1 female, 41 mm. long, collected by Stephens at Henjam Islands, Persian Gulf, B. M. 1932.2.18.43; 1 female, 58 mm. long, collected by Townsend at Hinderabi Islands, Persian Gulf, B. M. 98.6.29.163; 2 females, 29 and 34 mm. long, collected by Townsend at Jask, Mekran Coast, Persia (these specimens have a short horizontal white bar on the cheek under posterior part of eye—caudal and spinous dorsal only barely lengthened); female, 51 mm. long, collected by Knox at Muscat, B. M. 1912.11.26.1.

Description.—Dorsal rays XII,19–20; anal II,20–21; pectoral 14; pelvic I,3.

Nasal cirrus slender, single, simple, pointed, about equal to eye in length; forehead projecting, a concavity between it and upper lip; eye high and large, reaching into anterior profile and almost into dorsal profile; a single tiny canine on either side below, hidden in fold of membrane at corner of jaw; depth 5.2 to 5.7; head 4.3 to 4.5, both in standard length; dorsal deeply notched, the last spine about one-third length of the next preceding; posterior dorsal spines elevated, their tips free from the fin membrane, the fourth from the last as long as head, its distal one-fourth free from membrane; membrane from last ray reaching to, but not over, first small ray of caudal; caudal with 12 principal rays, none branched, the second and eleventh rays longest, the fin forked, almost filamentous, longer than head in specimens as much as 45 mm. long; anal spines of male both small and hidden at base of first ray; no pads or swellings at tips of anal rays; last ray bound fully to caudal peduncle but not reaching first caudal rays; longest pectoral ray equal to postorbital length of head; longest pelvic ray less than two-thirds postorbital length of head.

Coloration.—Male: Head, throat, and body rich, light brown (paler below) and with no markings back to level of sixth dorsal ray; on this pale posterior part of body five or six equally spaced, narrow, sharply defined dark vertical bars reaching from dorsal to ventral edge of body; the anterior line a little wider than pupil, the posterior one a little narrower; in some specimens there may be a shorter fine line between some of the main lines; basal half of spinous dorsal and all of soft dorsal evenly dusky; this area, while pigmented, transparent and with no markings; distal half of spinous dorsal pale, but bearing markings—an oval dark spot the size of pupil

between spines 1 and 2, another between 2 and 3, another between 5 and 6, another near end of 7, and another near ends of spines 8 and 9, last two spots thickened and involving the spines (on one specimen only the third and fifth of these dorsal spots are present); anal clear, narrowly edged with black; caudal dusky distally but with no actual markings and transparent; paired fins clear. FEMALE: Like male except that the body is plain brown without the markings so typical of the male.

Remarks.—As in most other species of the genus, the males and females of this species cannot normally be differentiated by the external sex organs. Examination of the gonads of the types of both *pulcher* and *anomalus* demonstrates that the former is the male, the latter is the female of the species. It is quite possible that this is the cognate in the western Indian Ocean of *opsifrontalis* from the Marshall Islands and *pro-oculis* from the Solomon Islands.

ECSENIUS LIVIDANALIS, new species

FIGURE 91

Holotype.—U.S.N.M. No. 144723, male, 34 mm. in standard length, collected by Chapman and Cheyne at Munda, New Georgia, Solomon Islands, June 15, 1944.

Paratypes.—U.S.N.M. No. 144291, 3 specimens, 24 to 33 mm., collected with holotype and bearing same data; U.S.N.M. No. 144292, 6 specimens, 24 to 30 mm., collected by Chapman and Cheyne in Munda Lagoon, New Georgia, Solomon Islands.

Description.—Dorsal rays XII,12–13; anal II,13–14; pectoral 13; pelvic I,3.

Nasal cirrus simple, slender, pointed, equal to about half diameter of pupil in length; forehead projecting slightly, but profile rounded; a single, tiny canine on each side below, rather far forward and no more than one-third the size of labial teeth; lateral tooth occasionally set off a little from the labial teeth; depth 3.6 to 4.3, head 3.3 to 3.5, both in standard length; spinous dorsal slightly rounded anteriorly, a little lower than soft dorsal; younger specimens show slight notch between spines and rays but older specimens have no notch, only a difference in level between spines and rays; last spine does not come up to edge of fin membrane and is only two-thirds height of next spine; membrane attaching last dorsal ray to caudal peduncle reaching over first two or three small caudal rays; last ray of anal similarly attached to caudal peduncle; genital papilla of female similar to that of *Salarias* and hides first tiny anal spine; second anal spine half length of first ray; anal highest in middle where it is two-thirds height of soft dorsal; male genital tube slender, nearly as long as first anal spine and situated midway between it and anus; caudal

evenly rounded, shorter than head by length of snout and one-third the diameter of eye; none of rays forked or exserted; longest pectoral ray shorter than head by snout and half the eye; longest pelvic ray equals two-thirds postorbital length of head, spine completely hidden, slender third ray scarcely visible without dissection.

Coloration.—MALE: Over-all color a rich, reddish brown, only a little lighter on throat than elsewhere; brown extends onto dorsals

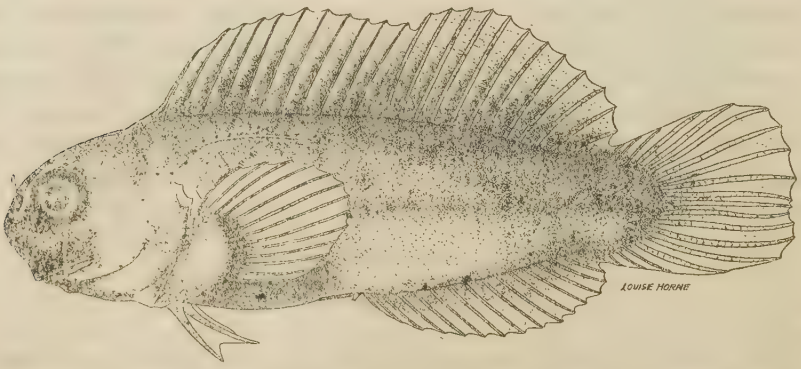

FIGURE 91.—*Ecsenius lividanalis*, new species. Holotype. (Drawn by Louise Horne.)

but fades distally so that outer half of fin more or less transparent; anal rather evenly dusky with edge lighter; caudal with only a little pigment along rays and on membrane basally; pectorals clear; eye black; a sharply defined black spot (brilliantly blue in life) half the area of eye surrounding anus, and set off from brown of body by a light peripheral band; no other markings on head, body, or fins. FEMALE: Same as male.

ECSENIUS MANDIBULARIS McCulloch

Ecsenius mandibularis McCULLOCH, Rec. Australian Mus., vol. 14, No. 2, p. 122, pl. 15, figs. 1 and 2, 1923 (type locality, Masthead Island, off Port Curtis, Queensland, Australia).

Specimens.—None examined. Description after McCulloch.

Description.—Dorsal rays XII,13–16; anal II,16–18; pectoral 13; pelvic I,3.

Nasal cirrus single, simple, borne on posterior nasal pore and about half diameter of eye in length; forehead slightly projecting but evenly rounded; six or seven small conical teeth on each side on ridge of dentary and behind labial teeth (in position occupied by the one or two tiny canines found in other species of the genus); depth 4.7, head 4.1, both in standard length; spinous dorsal rounded posteriorly, the last spine tiny, buried in membranes at bottom of deep notch between spinous and soft dorsals; longest dorsal spine a trifle shorter than longest ray; last dorsal ray bound to caudal peduncle by membrane

extending to first small rays of caudal; first anal spine buried in genital pad of female, but visible in male; anal lower than soft dorsal with a small fleshy pad at tip of each ray in male; caudal with 12 or 13 principal rays, those above and below irregularly exserted beyond fin margin in males; pectoral as long as postorbital length of head and half diameter of eye; longest pelvic ray about two-thirds postorbital length of head.

Coloration.—MALE: Head and body uniformly light brown with a bluish tinge on sides; two rows of well-defined, evenly spaced, dark spots each smaller than pupil along the sides, the upper, of about nine spots, above level of lateral line, the lower, along middle of side, beginning behind pectoral, and containing about seven spots; no other markings on head or body; fins without markings except pads on tips of anal rays distinctly lighter than rest of fin. FEMALE: Like male.

Remarks.—Set off from other species in the genus chiefly by the number of teeth in the canine series on the dentary.

FIGURE 92.—*Ecsenius pro-oculis*, new species. Holotype. (Drawn by Louise Horne.)

ECSENIUS PRO-OCULIS, new species

FIGURE 92

Holotype.—U.S.N.M. No. 144722, a male, 40 mm. in standard length, collected by Chapman and Cheyne, May 20, 1944, at a little island in Munda Lagoon near Sassavelle, New Georgia, Solomon Islands, among coral heads in about 10 feet of water.

Description.—Dorsal rays XII,14; anal II,15; pectoral 13; pelvic I,3.

Nasal cirrus single and simple, rather bluntly pointed, as broad as nasal pore on whose upper edge is it borne, about one-third diameter of eye in length; forehead strongly projecting so that anterior edge of orbit is a little beyond a vertical from margin of upper lip, giving

the eyes the effect of protruding; a single canine on either side below, rather far forward and no larger than corner labial teeth of lower jaw; the two corner teeth on each side of the lower jaw somewhat detached from rest of series and caninelike; depth 4.3, head 4.2, both in standard length; third spine of dorsal highest, with fin shortening rapidly posteriorly, next-to-last spine only half length of third spine or first ray, last spine a tiny nubbin almost buried in basal membrane of fin; third ray of soft dorsal longest; this part of fin also shortening rapidly posteriorly; membrane binding last ray to caudal peduncle covering first three or four small rays of caudal; soft dorsal a little higher than spinous dorsal, with deep notch between two parts of fin; anal lower than spinous dorsal; both anal spines plainly visible, the second being two-thirds the length of first ray, the first two-thirds the length of second; all rays except last with a small fleshy pad at the tip; last fully bound to caudal peduncle by membrane; genital papilla or tube of male a little longer than wide; caudal with 13 principal rays and 7 small rays both above and below; middle caudal rays equal head in length; third and fourth dorsal principal rays greatly elongated, extending beyond level of fin by two-thirds the length of middle rays; third principal ray from ventral edge of fin only slightly extended; none of caudal rays forked; longest pectoral and pelvic rays approximately equal in length and shorter than postorbital length of head by one-third the diameter of eye; third ray of pelvic, while entirely bound to, and much more slender than, second, plainly visible; pelvic spine not visible without dissection.

Coloration.—MALE: Peritoneum black; throat noticeably paler than sides of head and without markings; rest of head and the body a very dark reddish brown; a darker band as wide as pupil extending back from eye to edge of opercle; two horizontal light bands, each as wide as pupil, run full length of body, one from upper corner of opercle to upper part of caudal base, the other from under the pectoral to lower part of caudal base; no spots or other markings on head or body; spinous dorsal clear and transparent; soft dorsal with a clear band at base, then a narrow dusky band which shades off above to leave most of fin clear and transparent; middle third of caudal dusky, upper and lower thirds mostly clear; anal uniformly dusky with pads at tips of rays a little paler; pectorals clear; pelvics uniformly dusky. FEMALE: None available.

Remarks.—This species, and *E. opsifrontalis* from the Marshall Islands, are distinguished from the species by the marked projection forward of the orbits and the resultant backward slope from the forehead to the upper lip.

ECSENIUS OPSIFRONTALIS, new species

FIGURE 93

Holotype.—U.S.N.M. No. 142065, Rongelap Atoll, Rongelap Island, Marshall Group, collected by Brock, Herald and Kohler, July 25, 1946, in lagoon at depth of 18 feet, standard length 31 mm.

Paratype.—U.S.N.M. No. 142066, Bikini Atoll, collected by Brock and Schultz in lagoon at depth 20 to 25 feet, March 26, 1946, 1 specimen, 26.3 mm.

Description.—Dorsal rays XII,13; anal II,15; pectoral 13; pelvic I,3.

Certain measurements were made on the types, and these data are recorded in thousandths of the standard length in table 2.

Nasal cirrus single and simple, slender, rising on dorsal side of nasal pore, about half diameter of eye in length; forehead projecting so that anterior slopes from level of eye back to margin of upper lip at an angle of 30 to 45 degrees from the vertical; a single, small canine close behind other teeth on dentary, hidden by fold of membrane at

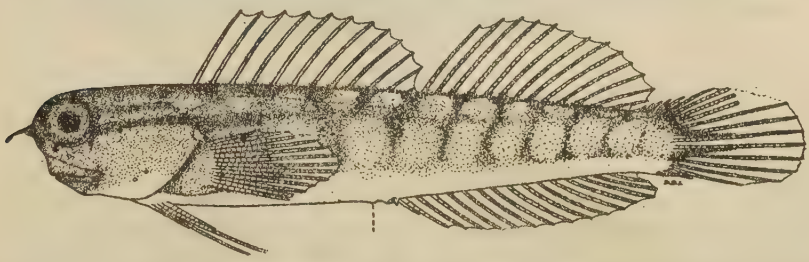

FIGURE 93.—*Ecsenius opsifrontalis*, new species. Holotype. (Drawn by Dorothea B. Schultz.)

corner of mouth; depth 4.8 to 5.1, head 3.8 to 3.9, both in standard length, dorsal spines all about same length, except that last is no more than two-thirds length of next-to-last; membrane definitely notched behind spinous dorsal; soft dorsal highest in middle, the longest ray a little longer than longest spine; last ray bound to caudal peduncle by a membrane which does not reach first small caudal rays; both anal spines visible in both sexes; females with a rounded, rather large genital pad with a tiny nubbin on posterior edge; males with a slender tube, half length of first spine, between anus and first anal spine; tips of first anal rays not swollen; longest anal rays shorter than longest dorsal spine or ray; caudal approximately truncate, the upper and lower rays not exserted in specimens of the sizes available; 13 principal rays, with about 6 or 7 small rays above and below; none of rays branched; pectoral shorter than head by less than half the diameter of eye; pelvic fin longer than postorbital length of head by more than half the diameter of eye, spine completely hidden, third

ray slender, shorter than second and so closely bound to it as to be clearly visible only by dissection.

Coloration.—MALE: Background of head and body light brown; a dark band as wide as eye extending straight back from posterior edge of eye to a vertical from about middle of spinous dorsal; two faint light bands about as wide as pupil running horizontally on body to base of caudal, one from upper edge of opercle, the other from below pectoral; eight narrow, dark, transverse bars spaced on body, running from base of dorsal down to, but not across, lower pale longitudinal band; two or three of these bars may be split dorsally; the last, on caudal peduncle, is C-shaped with the opening posterior; no spots or other markings on head or body; both lips dusky; anal fin with a dusky submarginal band, tips of rays white; other fins with no markings. FEMALE: essentially the same coloration as male.

Remarks.—This species is probably the Marshall Island cognate of *E. pro-oculis*, with which it shares many characters, but from which it differs as indicated in the key. The color is generally less dark than in *E. pro-oculis* and the markings are therefore less sharply defined.

ECSENIUS BICOLOR (Day)

FIGURE 94

Salarias bicolor DAY, Supplement to the fishes of India, p. 798 (on Tickell ms.) 1888 (type locality, Saddle Island, Kyoukphyoo Aracan); The fauna of British India . . ., vol. 2, Fishes, p. 323, 1889 (on type material).—WEBER, Die Fische der *Siboga*-Expedition, vol. 57, p. 533, 1913 (eastern tip of Timor).

Salarais furcatus (non De Vis 1884) JOHNSTONE, Report of Ceylon Pearl Oyster Fisheries, vol. 2, No. 15, p. 213, pl. 1, fig. 4, 1904 (type locality, Chilam Paar, Ceylon, at 15 to 20 meters depth).—WHITLEY, Rec. Australian Mus., vol. 17, No. 3, p. 136, 1929 (notes that this species is not the same as that of De Vis).

Salarias burmanicus HORA and MUKERJI, Rec. Indian Mus. Calcutta, vol. 38, p. 34, 1936 (type locality, Maung. Magan, Tavoy District, lower Burma).

Specimens.—11 specimens, 31 to 49 mm. long, collected by Chapman and Cheyne at Espiritu Santos, New Hebrides Island, U.S.N.M. Nos. 144716, 144293 and 144294; 6 specimens, 30 to 49 mm. long, collected by Andrews at Christmas Island (the type series of *Salarias melanosoma* Regan), B. M. 1909.3.4.52–57; 1 specimen, 44 mm. long, from Godeffroy Museum, from Ponape, B.M. 81.10.20.139; 2 specimens, 42 and 49 mm. long, from Godeffroy Museum, from Ponape, B.M. 81.10.-20.137; 1 specimen, 38 mm. long, collected by Weber at *Siboga* station 282, Oosthock of Timor.

Description.—Dorsal rays XII,16–17; anal II,18–20; pectoral 13–14; pelvic, I,3.

Nasal cirrus double; cirrus on dorsal side of nasal pore simple, slender, pointed, and equal to or a little greater than diameter of eye in length; cirrus on ventral edge of pore usually simple, but may be forked or even nearly double, half the length of the dorsal

cirrus and of same shape; anterior profile either vertical or with forehead slightly projecting; a single small canine close behind labial teeth, hidden by fold of membrane in corner of mouth on each side of lower jaw in males; not found in females; depth 5.0 to 5.2, head 4.5 to 4.8, both in standard length; dorsal spines all approximately same height except last, which are half height of first ray and two-thirds height of next-to-last spine; soft dorsal highest in its middle, and longest spine a little shorter than longest ray; spines not extending beyond fin membrane; in small specimens fin membrane comes down to height of last spine, making a distinct, if shallow, notch; in larger specimens of both sexes the membrane extends straight back with no notch between fins, only difference in level; membrane binding last ray of dorsal and anal to caudal peduncle reaching to, but

FIGURE 94.—*Ecsenius bicolor* (Day). Specimen from New Hebrides Islands. (Drawn by M. Nickerson).

not over, first small ray of caudal; caudal with 13 principal rays and 6 smaller ones both above and below; second and third principal rays extending beyond edge of middle rays, third to a distance equaling half length of middle rays; third principal ray from bottom extending even farther; in females of the same size the elongated caudal rays project by no more than one-fourth the length of the middle rays, and in smaller specimens of both sexes they scarcely extend beyond normal edge of fin; both anal spines plainly visible in both sexes, the second three-fourths the length of the first ray, the first one-half the length of the first ray; in male, but not female, each anal ray bears a small bulbous enlargement on anterior side of its tip; in male a slender genital tube half the length of first spine between anus and first spine; in females a rounded, rather large genital pad with a tiny nubbin on its posterior edge; longest pectoral ray shorter than head by length of snout and two-thirds eye; longest pelvic ray equal to about two-thirds postorbital length of head; pelvic spine and third ray completely hidden and visible only by dissection.

Coloration.—MALE: Head and anterior two-thirds of body almost uniformly dark brown (bluish in life); blackness of peritoneum makes abdomen darker than above; in posterior third of body this dark area

shades off into a very pale area, which extends over the caudal; this pale area bright golden in life; pale area extends anteriorly farther along base of anal, and a little way along base of dorsal; on smaller specimens the dark pigment extends farther posteriorly until there may even be a little on the base of the middle caudal rays, but always the fish is lighter posteriorly than anteriorly; no spots or markings on the head or body, except for an indistinct light band from the eye down across the upper lip and an indistinct dark streak directly behind the orbit; a continuous dusky band along basal portion of dorsal back to where light area of body begins, covering basal two-thirds of spinous dorsal, where it contains, over the first three spines, a horizontal, elongate, black streak; anteriorly the distal part of spinous dorsal clear except for margin; posteriorly this dark margin becomes wider until it melts into lower dusky band; soft dorsal with a dusky marginal band, but remainder of fin clear except for basal pigment anteriorly and a little pigment along each ray; in smaller specimens the dusky basal band extends to end of soft dorsal; anal fin with a fine clear band mesially, on anterior rays, which broadens posteriorly to cover base and more than half of fin; rest of fin, including whole distal edge, dusky except for fleshy pads on tips of rays, which are lighter; caudal entirely pale; pectoral rays dark, especially lower ones, but membranes clear and light; pelvics dusky, but lighter than body next to them; eyes almost black, as are the nasal cirri. FEMALE: Same as male except light posterior part of body continued to part of caudal peduncle, more of anal dusky, and there is some pigment on the distal two-thirds of middle of caudal.

Remarks.—While the description of *bicolor* by Day is brief and the fin counts contain either none of the spines, or not all of them, there is no question but that he was dealing with this well-marked species, as is true of the specimens described by Johnstone as *S. furcatus* and Hora and Mukerji as *S. burmanicus*.

The series of specimens described as *S. melanosoma* from Christmas Island might be considered as being subspecifically distinct from the above, for all these specimens have 18 soft rays in the anal (all the New Hebrides specimens have 19 or 20 soft anal rays), the upper and lower caudal rays either do not project, or project less than one-fourth the length of middle caudal rays, and the color is a uniform rich brown, scarcely lighter below than above. However, of the three specimens from Ponape one had 18 soft anal rays and the other two had 19, and there is no clearly distinguished color break posteriorly. One has the caudal rays extended by the length of the middle caudal rays, the other two by less than one-third the length of the middle caudal rays. There is no dependable evidence in this group of subspeciation.

The specimen from Timor is identical with the New Hebrides specimens except that it has only 18 soft anal rays. Coloration well marked.

Ecsenius namiyei is doubtless the Formosan cognate of this species, marked particularly by the greater number of dorsal and anal rays, and the uniform coloration of the body.

Escenius frontalis is very likely the Red Sea cognate of this species, well marked, however, by the single nasal cirrus and the 15 pectoral rays.

ECSENIUS NAMIYEI (Jordan and Evermann)

FIGURE 95

Salarias namiyei JORDAN and EVERMANN, Proc, U. S. Nat. Mus., vol. 25, p. 362, fig. 25, 1902 (type locality, Pescadores Islands).

Specimens.—None seen; description from Jordan and Evermann.

Description.—Dorsal rays XII,20(?); anal II,21; pectoral 13; pelvic I,3 (?).

A pair of tentacles on nasal pore, the longest no longer than diameter of pupil; forehead vertical, the orbits reaching the dorsal but not

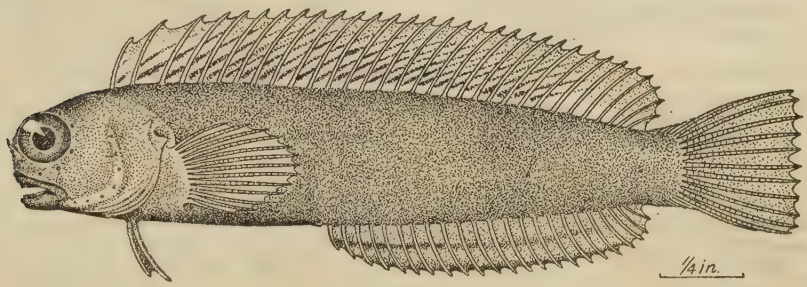

FIGURE 95.—*Ecsenius namiyei* (Jordan and Evermann). Holotype. (Drawn by A. H. Baldwin.)

anterior profile of head; depth 4.5, head 4.5, both in standard length; dorsal rays all about the same height except for last three rays, no trace of notch; membrane from last dorsal and anal rays free from first caudal rays; caudal with 12 principal rays, none branched, truncate behind; pectoral shorter than head by snout and half the eye diameter; pelvics two-thirds postorbital length of head.

Coloration.—Body purplish red, paler posteriorly; dorsal fin with narrow oblique darker markings; anal darker along margin, with a similar median band.

Remarks.—This is undoubtedly the Formosan cognate of *E. bicolor.* The three more rays in dorsal, one more in anal, and the oblique markings of the dorsal prevent synonymizing it with *bicolor* in the absence of a series of specimens for comparison.

ECSENIUS HAWAIIENSIS, new species

FIGURE 96

Holotype.—U.S.N.M. No. 112293, Oahu Island, Pearl Harbor, from a drydock, "hauled from Guam about a year ago and left standing," April 1950, collected by Spencer Tinker, standard length 66 mm.

Paratypes.—U.S.N.M. No. 112294, taken with holotype and bearing same data, 12 specimens, 48 to 70 mm.

Description.—In addition to the counts recorded in table 1, the pelvics were always I,3; none of the caudal fin rays is branched.

Certain measurements were made on the holotype and two paratypes and these data are recorded in table 2.

TABLE 2.—*Measurements on certain species of* Ecsenius, *recorded in thousandths of the standard length*

Characters	*opsifrontalis*		*stigmatura*			*hawaiiensis*		
	Holotype	Paratype	Holotype	Paratypes		Holotype	Paratypes	
Standard length in mm	31.0	26.3	46.5	37	36.2	66	66.7	48
Head, tip of snout to front of upper lip	255	266	249	251	263	227	220	227
Total length of head	281	278	262	273	279	242	234	240
Greatest depth	197	209	215	224	248	207	202	217
Least depth of body	97	95	105	116	111	112	111	104
Postorbital length of head	181	182	178	184	180	165	157	161
Eye	77	80	69	81	83	59	68	71
Snout	74	76	67	73	72	77	73	67
Interorbital space (fleshy)	31	34	32	30	33	38	30	38
Length of posterior nasal cirrus	39	38	49	65	83	52	60	69
Longest fin ray:								
Dorsal spine	158	141	114	135	146	121	135	150
Dorsal soft ray	177	145	142	119	163	189	165	133
Anal	126	126	118	122	105	118	112	125
Pectoral	242	236	183	184	191	151	145	133
Pelvic	226	198	110	132	122	103	84	110
Caudal	232	240	221	249	265	313	331	202
Snout tip to anus	558	559	542	552	530	508	487	516
Snout tip to dorsal origin	258	285	236	257	248	212	210	219
Length of anal fin base	355	327	380	386	378	484	408	406

Head 4.0 to 4.2; greatest depth 4.5 to 4.8; longest pectoral ray 6.1 to 6.3; snout tip (upper lip) to anus 2.1; anal fin base 2.3 to 2.4; all in the standard length. Eye 3.5 to 4.0; snout 3.1 to 3.4; postorbital length of head 1.4 to 1.5; greatest depth of body 1.2 to 1.3; least depth of body 2.2 to 2.5; longest pectoral ray 1.5 to 1.6; longest dorsal spine 1.7 to 1.8; all in the length of head from tip of upper lip to rear of gill cover. Fleshy interorbital space 1.8 to 2.0 in eye.

No orbital cirrus; no nuchal cirrus; a single, simple nasal cirrus arises on upper edge of anterior nasal opening, and a shorter cirrus, sometimes bifid to base, arises on lower edge of nasal opening; snout

profile with a notable backward slant from the vertical of about 15 degrees; edges of both lips smooth, lateral line running a dorsal course and ending opposite bases of last or next-to-last dorsal spines, about an eye diameter behind tip of pectoral fin; lateral line does not descend to middle of side; vertical line through dorsal origin passes a trifle in front of upper edge of gill opening; base of pectoral fin notably behind base of pelvics; last dorsal ray attached by membrane to dorsal edge of caudal peduncle, but not to base of caudal fin; anal origin opposite base of last dorsal spine; last anal ray attached by membrane to lower edge of caudal peduncle; pectoral fins reaching about two-thirds the way to anus; anal spines small, first embedded on females; posterior canine of lower jaw short but strong; teeth in upper jaw about 110, movable; those in lower jaw movable but firmer, in one specimen 38, the tooth farthest from the symphysis on each side enlarged; no vomerine teeth; posterior margin of caudal fin truncate on smallest

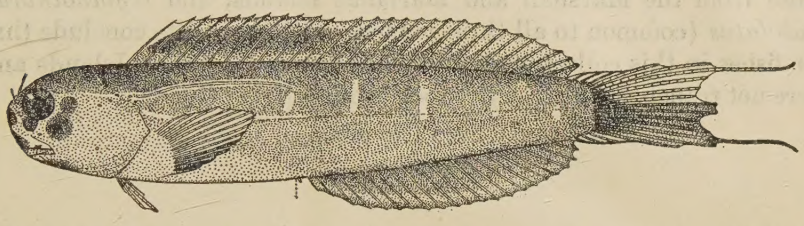

FIGURE 96.—*Ecsenius hawaiiensis*, new species. Holotype. (Drawn by Aime M. Awl.)

specimen, with an outer ray in each lobe slightly elongate, whereas in largest specimens the inner sixth or seventh caudal rays are shortest and of nearly equal length, the fourth and fifth from center of fin in upper caudal lobe are greatly elongate, and the third and fourth from center in lower lobe are greatly elongate, sometimes twice the length of shortest caudal fin ray; no cephalic crest; a vertical line through front edge of upper lip passes through front edge of eye; the forehead is a little in front of front edge of upper lip.

Coloration.—In alcohol, olive-brown to light greenish brown; darker dorsally, paler ventrally; the posterior part of body not notably paler than anterior part of body as is *E. bicolor;* middle of sides with five to seven short narrow vertical white bars not wider than pupil and about two to four times longer than wide, the lower edge of these bars a little below midlengthwise axis of body, then they continue dorsally, fading out gradually before reaching base of dorsal fin; pectoral, dorsal, and anal fins dusky; pelvics slightly dusky; caudal fin with outer rays white or nearly so, the middle rays dusky; behind eye is an obliquely oblong blackish blotch, margined with pale; a pale streak extends posteriorly from behind middle of eye a short distance; corner of mouth white or pale.

Remarks.—This new species belongs to the group of species centering around *E. bicolor* but differs from that species chiefly in coloration; *hawaiiensis* has short white bars on the midsides, whereas *bicolor* is plain brown without markings.

Doubt might be cast on the source of this material, "a dry dock hauled from Guam about a year ago," if with this new species (which did not occur in the extensive collections made in the Marshall and Marianas Islands by a group of collectors during and after the war) other species had not been taken as follows: *Scorpaenopsis cacopsis* (known only from the Hawaiian Islands), *Cirrhitichthys aprinus*, a specimen of *Apogon*, several specimens of gobies not yet identified, 2 specimens of an unidentified species of *Acanthurus* in the settling stage of late metamorphosis, specimens of *Pseudochromis tapeinosoma* and *Tripterygion hemimelas* (common to the Marshall, Marianas, and Hawaiian Islands) having about one more scale on the average than those from the Marshall and Marianas Islands, and *Gymnothorax undulatus* (common to all three named localities). We conclude that the fishes in this collection are endemic to the Hawaiian Islands and were not transported in the drydock brought from Guam.

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